CLAIMS

1. A method for desulfurizing hydrocarbon oils comprising bringing a hydrocarbon oil containing at least one sulfur compound selected from the group consisting of thiophene compounds, benzothiophene compounds, and dibenzothiophene compounds or a hydrocarbon oil further containing aromatic hydrocarbons into contact with a solid acid catalyst and/or activated carbon containing a transition metal oxide.

2. The method according to claim 1, wherein sulfur compounds contained in the hydrocarbon oil are reacted among themselves and/or with aromatic hydrocarbons by bringing the hydrocarbon oil into contact with the solid acid catalyst.

3. The method according to claim 2, wherein the sulfur compounds in the hydrocarbon oil and heavy sulfur compounds produced by the reaction among the sulfur compounds contained in the hydrocarbon oil and/or by the reaction of the sulfur compounds with aromatic hydrocarbons are adsorbed by a solid acid catalyst and/or activated carbon containing a transition metal oxide.

4. The method according to any one of claims 1 to 3, wherein the hydrocarbon oils are desulfurized to a content of the total sulfur compounds (as sulfur) of 1 ppm or less.

5. The method according to any one of claims 1 to 4, wherein the solid acid catalyst comprises zeolite selected from the group consisting of proton-type faujasite zeolite, proton-type mordenite, and proton-type β-zeolite.

6. The method according to claim 5, wherein the silica/alumina ratio of the

faujasite zeolite, mordenite, and β-zeolite is 100 mol/mol or less.

7. The method according to claim 5 or 6, wherein the content of cations other than proton in the faujasite zeolite, mordenite, and β-zeolite is 5 mass% or less.

8. The method according to any one of claims 1 to 4, wherein the solid acid catalyst comprises a solid superacid catalyst selected from the group consisting of sulfated zirconia, sulfated alumina, sulfated tin oxide, sulfated iron oxide, tungstated zirconia, and tungstated tin oxide.

9. The method according to claim 8, wherein the solid superacid catalyst has a specific surface area of 100 m^2/g or more.

10. The method according to any one of claims 1 to 3, wherein the transition metal oxide is copper oxide.

11. The method according to any one of claims 1 to 10, wherein the hydrocarbon oil contains aromatic hydrocarbons as major components.

12. The method according to claim 11, wherein the aromatic hydrocarbon is at least one hydrocarbon selected from the group consisting of benzene, alkylbenzene having 7-14 carbon atoms, naphthalene, and alkylnaphthalene having 11-18 carbon atoms.

13. The method according to any one of claims 1 to 12, wherein the hydrocarbon oil is kerosene or gas oil.

14. The method according to claim 13, wherein the kerosene or gas oil is desulfurized in a fuel cell vehicle in which kerosene or gas oil is used as an on-board

reforming fuel.

15. Kerosene having a sulfur content of 1 ppm or less and a content of thiophenes, benzothiophenes, and dibenzothiophenes in the total sulfur content of 10% or less.

16. Kerosene having a sulfur content of 1 ppm or less and a content of thiophenes and benzothiophenes in the total sulfur content of 10% or less.

17. A fuel cell system comprising desulfurizing kerosene with a dibenzothiophene content (as sulfur) of 0.1 ppm or less using any one of method according to claims 1 to 12, supplying the kerosene to the fuel cell system, and generating hydrogen for fuel cell.